

Remarks

This is filed in response to the Office Action mailed August 14, 2003, rejecting the pending claims over Scheibler in view of Corfits. The amendments above, combined with remarks below, remove all grounds for rejection of the application. In view thereof, the Applicants respectfully request that the Examiner reconsider and withdraw the objections and rejections, so that this application can pass forward to issuance.

The Claimed Subject Matter Is Patently Distinct from the Art

Independent claim 1 is directed to a digital data processor chassis of the type having a plurality of slots each for slidable insertion of a respective circuit board. The improvement is characterized wherein at least one slot has first and second sets of airflow apertures disposed adjacent a location of edges of a plenum in which one or more circuit components of the respective inserted circuit board are contained. At least one of these sets has plural airflow apertures and, together, the sets are arranged to pass airflow through the plenum of that board. Moreover, at least one of the sets is arranged so that an impedance to airflow passing through the respective inserted circuit board substantially matches impedances to airflow passing through one or more other boards inserted in one or other slots in the chassis -- which other boards would otherwise have different impedances to airflow than the respective inserted circuit board.

The claim is amended to highlight those aspects of the chassis which permit finely-controlled management of air flow through the board plenum. Specifically, the amendments recite that the chassis is vacuum or dip brazed and that the aforementioned slot has a channel that receives and forms an air-tight seal with the respective circuit board. The amendments further recite that the circuit board received by the slot has a plenum formed between the substrate and a cold-plate in which plenum the circuit components of the board reside and which is in thermal communication with the substrate and/or components. That plenum further has one or more air flow-diverting elements that divert air flow within the plenum to/from those components requiring greater/less air flow. Finally, the amendments provide that at least one of the sets of air flow apertures in the slot are sized so that the matching of impedances is achieved in conjunction with the air flow diverting elements of the respective circuit board.

Support for the amendments is provided, for example, in the Specification as filed at Figures 4A – 4C, as well as in the accompanying text, e.g., at pages 22 – 23. Further support is provided, for example, at Figure 1A and the accompanying text, e.g., at pages 11 – 12.

Independent claim 8 is directed to a card cage for a digital data processor having features paralleling those of the chassis described above.

Independent claim 13 is directed to a digital data processor having a chassis and slots paralleling those recited in claim 8.

Claims 2-4, 7, 9-11, and 14-21 depend from claims 1, 8 and 13 and recite further features on the digital data processor and card cage thereof.

The cited references, Scheibler and Corfits, fail individually and in combination to teach or suggest a chassis, card-cage or digital data processor having features like those of claims 1, 8 and 13, respectively, which permit finely-controlled management of air flow through a circuit board plenum. Scheibler and Corfits are examples of prior art systems in which air flow is managed only coarsely. Such systems attempt to move air through a typically highly unstructured, uncontrolled and leaky environment (within the chassis) over the external surface of the boards. As a result they can only achieve what the Applicants hereof predict to be a fraction of the power densities that chassis, cages and/or digital data processors according to the instant invention support.

Turning to Scheibler, that reference fails to teach or suggest a vacuum or dip brazed chassis in which board-receiving slots form air-tight seals with their respective circuit boards. Instead, the card cage of Scheibler appears to be of conventional pressed or sheet-metal construction with slots that retain — but not form air-tight seals with — their respective boards.

Scheibler also fails to teach or suggest routing air flow to plenums defined in the received circuit boards between the board substrates and cold plate covers coupled thereto. Still further Scheibler fails to suggest that those plenums could contain, not only circuit components, but also air flow-diverting elements that divert air flow within the plenum to/from those components or regions requiring greater/less air flow.

Still further, Scheibler fails to teach or suggest that at least one of the sets of air flow apertures in a slot are sized so that the matching of impedances is achieved in conjunction with the air flow diverting elements of the respective circuit board.

Although the Examiner relies on Corfits to remedy the shortcomings of Scheibler, the latter fails in that regard. Thus, for example, Corfits fails to suggest using a cold-plate which is in

thermal communication with the substrate and/or components to define a plenum for those components.

Moreover, Corfits fails to teach or suggest vacuum or dip brazing a chassis in which board-receiving slots form air-tight seals with their respective circuit boards. As with Scheibler, the Corfits card cage appears to be of conventional pressed or sheet-metal construction with slots that retain — but not form air-tight seals with — their respective boards.

Corfits also fails to teach or suggest routing air flow to plenums that contain, not only circuit components, but also air flow-diverting elements that divert air flow within the plenum to/from those components or regions requiring greater/less air flow.


Still further, Corfits fails to teach or suggest that at least one of the sets of air flow apertures in a slot are sized so that the matching of impedances is achieved in conjunction with the air flow diverting elements of the respective circuit board.

For these reasons, among others, the combined teachings of Scheibler and Corfits are not believed to render obvious the subject matter of the pending independent claims, nor that of the dependent claims that derive therefrom.

Conclusion

This responds in full to the Office Action mail August 14, 2003. The application is amended to overcome all grounds for rejection. In view hereof, the Applicants respectfully request that the Examiner reconsider and withdraw all objections to, and rejections of, the application, so that it may pass forward to issuance.

Respectfully submitted,
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